The DDD Mode Pacemaker Therapy and Long-term Follow-up in a Case With Congenitally Corrected Transposition of Great Arteries

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ABSTRACT

A 19 year-old male with recent syncope complaint and complete atrioventricular (AV) block was admitted to our clinic. The patient had a history of congenitally corrected transposition of great arteries and associated ventricular septal defect and first degree AV block at the age two. At seven years of age he was found to be in complete AV block. As ECG demonstrated that complete AV block still continued with a ventricular escape rhythm at a rate of 40 beats/min, a dual chamber pacemaker was implanted. The patient remained asymptomatic for the next three years, and the values of threshold and impedance of the leads implanted in the morphological left ventricle and the right atrium by endocardial approach remained unchanged at the end of the third years.

KEYWORDS
Congenitally corrected transposition of great arteries, complete atrioventricular block, DDD mode pacemaker.

Doğuştan Düzeltilmiş Büyük Damar Transpozisyonu Olan Bir Vakada İki Odacıklı Kalp Pili Tedavisi ve Uzun Dönem Takibi

ÖZET

On dokuz yaşında erkek hasta bayılma şikayetleri ve atrioventriküler (AV) tam blok nedeniyle kliniğimize yatırıldı. İki yaşında doğuştan düzeltilmiş büyük arterlerin transpozisyonu ve bununa ilişkili ventriküler septal defect ve birinci derece AV blok tanısı konan hastada, 7 yaşında AV tam blok gelişti. Hastaya, EKG’de kalp hızının 40/dak olması ve A V tam bloğun halen devam etmesi üzerine iki odacıklı kalp pili yerleştirildi. Hasta 3 yıllık izlemde asemptomatik olarak kaldı ve endokardiyal yaklaşımla morfolojik sol ventrikül ve sağ atriyuma yerleştirilen pasif fıkasyon leadlerin eşik ve direnç değerleri 3 yıl sonunda değişmedi.

Anahtar Kelimeler
Doğuştan düzeltilmiş büyük damarların transpozisyonu, atrioventriküler tam blok, iki odacıklı kalp pili

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Introduction

Congenitally corrected transposition of great arteries (c-CTGA) is a rare anomaly and comprises <1% of all forms of congenital heart diseases (1). In this anomaly, the right atrium enters the morphological left ventricle and left atrium enters the morphological right ventricle.

Most common symptoms in these patients are heart failure, morphological tricuspid valve failure and symptoms developed secondarily to atrioventricular (AV) block. In the treatment of complete AV block, the implantation of permanent pacemaker by endocardial approach has recently been preferred over the epicardial approach, which requires thoracotomy (2-5). However, there is not enough data concerning the safety of the passive fixation leads implanted daily in the morphological left ventricle and the right atrium by endocardial approach.

In this case, we aimed to demonstrate the long term follow-up of a DDD mode pacemaker implanted endocardially in a c-CTGA case by using passive fixation leads.

Case Reports

The case report involves a 19-year old male who was diagnosed to have c-CTGA and associated ventricular septal defect and first degree atrioventricular (AV) block. In the treatment of complete AV block, the implantation of permanent pacemaker by endocardial approach has recently been preferred over the epicardial approach, which requires thoracotomy (2-5). However, there is not enough data concerning the safety of the passive fixation leads implanted daily in the morphological left ventricle and the right atrium by endocardial approach.

In this case, we aimed to demonstrate the long term follow-up of a DDD mode pacemaker implanted endocardially in a c-CTGA case by using passive fixation leads.

Discussion

Atrioventricular conduction anomalies are seen commonly in c-CTGA and the conduction system is known to be particularly vulnerable for the development of AV block. Of the patients, >50% show first degree AV block and >25% develop complete AV block (6). There are some problems in the treatment of complete AV block with permanent pacemaker implanted by endocardial approach in patients with c-CTGA: (1) complications due to the procedure because of the complex anatomy, (2) difficulties in implanting lead in the morphological left ventricle, which lacks extensive trabecular network essential for pacemaker lead stability, (3) lack of enough data available concerning long term function of lead implanted into morphological left ventricle and cumulative survival.

The function of leads implanted through endocardial and epicardial approaches or the long term
follow-up lead survival has been studied retrospectively in only one study so far. In this study, Mark-Estes et al. have demonstrated that long term follow up data among 40 patients with CTGA complicated with complete AV block show no significant difference in the incidence of malfunction or cumulative lead survival of endocardial leads when compared with epicardial leads, although they implanted only VVI endocardial pacemakers (7). In patients with CTGA, even if they did not have any significant associated structural cardiac defects, (1) more than one third had congestive heart failure by the fifth decade. AV synchrony known to contribute to about 20-30% of cardiac output at rest may be important in patients with c-CTGA. Many studies have shown that during exercise an increase in the pacing rate provided by the DDD mode increase the cardiac output and the duration of exercise more than fixed frequency VVI pacing (8). Thus, DDD mode pacemaker may be an advantage in the patients with c-CTGA.

In literature, the patients with c-CTGA who were successfully implanted DDD pacemaker were reported, although there are not so many (2-5). As mentioned previously, in patients with c-CTGA, morphological LV into which the pacemaker electrode was implanted does not have enough trabeculation, which may cause lead dislodgement in both short term and long term. However, in our literature research we could not find any data concerning the changes in atrial and ventricular threshold and impedance values at long term follow up of these patients. In this case, passive fixation leads were easily implanted in the morphological left ventricle and the right atrium by endocardial approach without any complications. In patients with c-CTGA who run the risk of developing serious morphological right ventricle failure, DDD mode pacemaker may be first considered because the maintenance of the physiology electrical activity of the heart can be an advantage.

ECG showing the presence of complete atrioventricular block with a ventricular escape rhythm at a rate of 40 beats/min.

FIGURE 1
The DDD Mode Pacemaker Therapy and Long-term Follow-up in a Case With Congenitally Corrected Transposition of Great Arteries

ECG records of the patient after implanted DDD mode pacemaker.

REFERENCES


